

TEACHER PROFESSIONAL DEVELOPMENT IN MATHEMATICS AND SCIENCE

Key Findings: Italy, Japan, Russian Federation, United Kingdom (England and Scotland only),¹³ United States

About two-thirds of U.S. fourth-graders had teachers who reported participating in professional development pertaining to mathematics content. Teacher participation in this area was lower in Italy, Japan, and Scotland.

The 2003 Trends in International Mathematics and Science Study (TIMSS 2003) asked teachers of fourth- and eighth-graders to report on their professional development participation in several areas in the 2 years before the assessment. This indicator discusses the results for teachers of fourth-graders in four areas: content, pedagogy/instruction, improving students' critical thinking or problem-solving skills, and assessment. (Teachers reported participation separately for mathematics and science.) The results show considerable variation by area of professional development, subject area, and country.

In 2003, about two-thirds of U.S. fourth-graders had teachers who reported participating in professional development pertaining to mathematics content in the previous 2 years (figure 13). Teacher participation in this area was lower in Italy, Japan, and Scotland (ranging from 29 to 42 percent), but higher in England (76 percent). At least half of the fourth-graders in England, the Russian Federation, and the United States had teachers who reported participating in the other three areas of professional development in mathematics.

The percentage of fourth-graders whose teachers reported participating in professional development pertaining to mathematics pedagogy/instruction ranged from 30 percent in Italy to 88 percent in England, with the United States at 54 percent. In mathematics, more fourth-graders in the United States than in Scotland, Japan, and Italy had teachers who reported participating in professional development in the area of improving students' critical thinking or problem-solving skills and in the area of assessment. However,

a greater percentage of students in England than in the United States had teachers who reported participating in professional development in the area of improving students' critical thinking or problem-solving skills in mathematics (72 vs. 58 percent).

In England, Italy, and the United States, there was generally more reported participation in professional development in mathematics than in science in each of the four areas, with one exception (in Italy, no statistically significant difference was detected in the area of content). Across all four areas, no G-8 country reporting data had more fourth-graders with teachers reporting professional development participation in science than in mathematics.

The percentage of fourth-graders in England, the Russian Federation, and the United States whose teachers reported participating in professional development in science ranged from 30 percent in England in assessment to 51 percent in the Russian Federation in pedagogy/instruction. In Italy, the percentage of fourth-graders whose teachers reported participating in professional development in science was 22 percent or less in all four areas.

The percentage of fourth-graders whose teachers reported participating in professional development pertaining to science pedagogy/instruction ranged from 15 percent in Italy to 51 percent in the Russian Federation, with the United States at 38 percent. In science as in mathematics, more fourth-graders in the United States than in Scotland, Japan, and Italy had teachers who reported participating in professional development in the area of improving students' critical thinking or problem-solving skills and in the area of assessment. However, a greater percentage of students in the Russian Federation than in the United States had teachers who reported participating in professional development in the area of science assessment (45 vs. 34 percent).

Definitions and Methodology

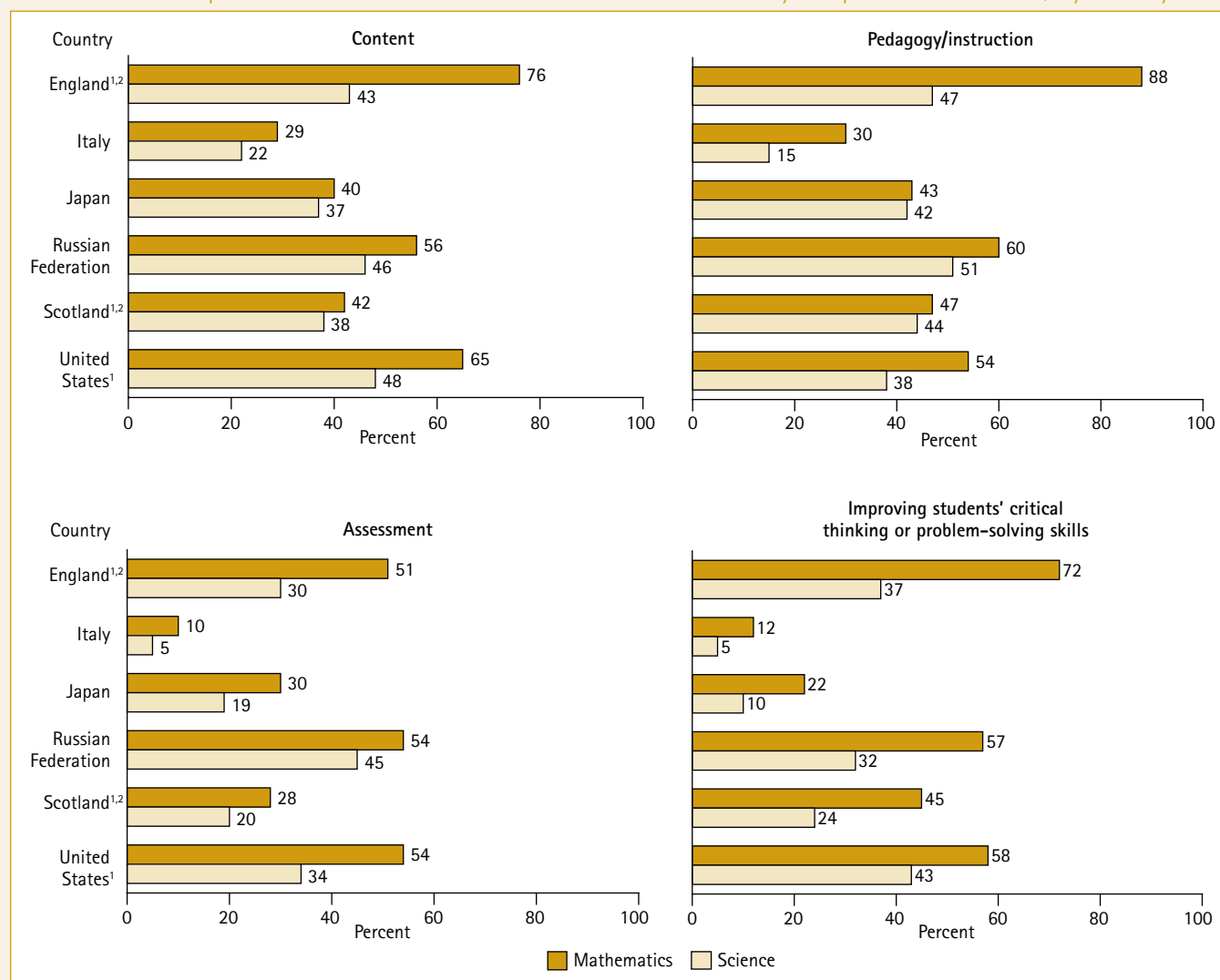
Data for this indicator are from the TIMSS 2003 fourth-grade teacher questionnaire, which was designed to obtain information about the classroom contexts for the teaching and learning of mathematics and science, and about the implemented curriculum in these subjects. For each participating school at the fourth grade, one teacher questionnaire was administered to the classroom teacher of the sampled fourth-grade class. The TIMSS 2003 fourth-grade

teachers do not constitute representative samples of teachers. Rather, they are the teachers for nationally representative samples of fourth-grade students. Thus, the teacher data presented in this indicator were analyzed at the student level.

Countries were required to sample students in the upper of the two grades that contained the largest number of 9-year-olds. In the United States and most countries, this corresponds to grade 4.

¹³In the data source for this indicator (TIMSS 2003), the United Kingdom is represented separately by two of its component jurisdictions, England and Scotland. Northern Ireland and Wales did not participate in this study.

Figure 13. Percentage of fourth-grade students whose teachers reported that they participated in various professional development activities in mathematics and science in the 2 years prior to assessment, by country: 2003



¹Met international guidelines for participation rates in 2003 only after replacement schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, replacement schools that have similar characteristics to the sampled schools that they may replace.

²Data are available for at least 70 percent, but less than 85 percent, of the students. Missing data have not been explicitly accounted for in the data.

SOURCE: Martin, M.O., Mullis, I.V.S., Gonzalez, E.J., and Chrostowski, S.J. (2004). *TIMSS 2003 International Science Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 6.8. Chestnut Hill, MA: Boston College; and Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., and Chrostowski, S.J. (2004). *TIMSS 2003 International Mathematics Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 6.7. Chestnut Hill, MA: Boston College.